



NPDES Permit Program Bureau of Water

2600 Bull Street
Columbia, SC 2929201
(803) 898-4300

MEMORANDUM

To: NPDES Permittee

From: Industrial, Agricultural and Storm Water Permitting Division and
Water Facilities Permitting Division

Date: June 2, 2005

RE: NPDES Application Supplement
Mixing Zone Request Form

The Department has determined that your facility may be subject to whole effluent toxicity (WET) testing monitoring and/or limitations based on the nature of your discharge(s). In order to get the appropriate information needed to determine permit requirements, the attached documents have been developed to assist you in submitting this information.

As explained on the attached Mixing Zone Request Form and Mixing Zone Analysis and Boundary Conditions document, there are different permitting scenarios. For situations in which the receiving stream is effluent-dominated (the IWC is at least 80%), no mixing zone demonstration is needed. However, in order for us to determine mixing zone size and WET requirements for all other discharge(s), please complete the attached mixing zone request form. Please submit the form with an attached cover letter, required supplemental information and a report, if necessary, describing the work performed and any other pertinent information relative to the discharge(s) that might influence WET requirements. Instream assessments that have already been performed may be valuable additional information.

If you choose to perform a mixing zone demonstration, the Department recommends a proposed demonstration plan be submitted for review and approval prior to any work being performed. The proposal must address the factors outlined in the Mixing Zone Request Form. Depending on the time needed to complete a demonstration, a schedule of compliance with a final chronic WET limit at 100% may be placed in the permit to allow time for the demonstration to be performed and the results submitted. Upon approval of the demonstration, a permit modification will be necessary to place different WET requirements in the permit based on the results of the demonstration.

In addition to the above, please indicate whether a pass/fail (single dilution) or multi-concentration test is preferred. The pass/fail, or single dilution, test, provides for a confidence level of 99% on a chronic test for determining whether a test statistically passes or fails. The data from a pass/fail test may not, in some situations, be useful in determining whether reasonable potential for WET exists. The multi-concentration test, however, provides more information on toxicity over a range of concentrations and may give enough information to show that reasonable potential does not exist. The limitations for a multi-concentration test are expressed as a percent effect and allow for averaging of test results. A pass/fail test has a maximum pass or fail limit and does not allow for averaging of results to demonstrate compliance.

Should you have any questions or comments, please contact your permit writer or this office at (803) 898-4300.



South Carolina Department of Health
and Environmental Control

NPDES APPLICATION SUPPLEMENT

Mixing Zone Request Form
for
Surface Water Discharges

NPDES #: _____

Facility Name: _____

County: _____

Are you requesting a mixing zone for whole effluent toxicity (WET) in accordance with the back of this form?

☐ **No.** No further information is needed. Submit this form. If WET testing is required, a chronic test at 100% will be required, unless the IWC is at least 80%.

☐ **Yes.** Check one of the boxes below and submit this form with the appropriate information.

☐ Check this block if you are proposing to perform or have performed a mixing zone demonstration to determine the appropriate zone of initial dilution (ZID) and/or mixing zone size. Complete the remainder of this form and submit a mixing zone demonstration plan as described on the back of this form. The Department recommends the demonstration plan be approved prior to implementation of any demonstration work.

☐ Check this block if you are requesting a mixing zone by providing limited information such as a mixing model like CORMIX to determine mixing in accordance with suggested zone of initial dilution (ZID) and/or mixing zone sizes. Complete the remainder of this form, as applicable, and submit the CORMIX Supplement and modeling results (or other model assumptions, inputs and results).

What is the proposed ZID size (in meters)? Length: _____m Width: _____m

What is the proposed acute WET test concentration? _____%

What is the proposed mixing zone size (in meters)? Length: _____m Width: _____m

What is the proposed chronic WET test concentration? _____%

Printed Name: _____ **Firm:** _____

Signature: _____ **Date:** _____

Mixing Zone Analysis and Boundary Conditions

Mixing zones must have the qualities of no acutely toxic impact, must allow for safe passage of aquatic organisms, must provide for protection of existing and designated uses of the waterbody, and must not endanger public health and welfare. The Department recognizes different methods for establishing a mixing zone and its boundary conditions and suggests using the following protocol.

The Department has approved the establishment of mixing zones using the following methods of analysis.

- CORMIX modeling or other modeling tools.
- Instream assessments using dyes or conductivity measurements.
- Other appropriate methods.

Boundary conditions of mixing zones may be established as follows.

- *Effluent dominated discharges.* For situations where the instream waste concentration (IWC) using design flow conditions for domestic facilities or long term average flow for industrial facilities and where critical flow conditions (e.g., 7Q10) represent at least 80%, the Department considers that the discharge will be completely mixed within a reasonably minimized area and therefore, test concentrations may utilize 100% of the critical flow condition (e.g., 7Q10). Therefore, use of the complete dilution of the receiving body is appropriate.
- *Other discharges.* For other situations, a demonstration is required to minimize the mixing zone by using the above-mentioned methods to determine chronic mixing permit conditions based on a boundary of one-half the width of the stream (width) and a length downstream of twice the width of the river. Acute mixing conditions are based on a boundary of one-tenth the width of the stream (width) and a length downstream of one-third the width of the river. At the discretion of the permittee (or applicant), an alternative analysis may be prepared for possibly larger mixing zone boundaries, but methods should be used that address a mixing zone analysis consistent with the EPA Technical Support Document for Water Quality-based Toxics Control (TSD) and the water quality standards regulatory mixing zone requirements (e.g., biological, chemical, engineering, hydrological and physical factors).
- *Discharges with Diffusers.* Where a properly installed diffuser provides for a mixing zone that meets the criteria above and addresses biological, chemical, engineering, hydrological and physical factors, a test concentration can be set in a permit at the justified percentage of the critical flow condition (e.g., 7Q10) up to 100% of that critical flow condition. For boundary conditions, please see above.

Mixing Zone Request Form for Surface Water Discharges

1. Purpose:

This supplement will be completed as part of the NPDES permitting application. It will be provided to the Department for any new or reissuance NPDES permit application. This supplement is to provide a written statement on NPDES permit applicants request for a mixing zone as may be allowed.

2. General:

Mixing zone demonstration information will be submitted along with this form.

3. Item by Item Instructions:

<i>NPDES # :</i>	Enter the NPDES permit of the facility. If this is a new discharge, enter "new discharge."
<i>Facility Name:</i>	Enter the name of the facility.
<i>County:</i>	Enter the county of the facility.
<i>Questions:</i>	Answer the questions and provide the appropriate information for a mixing zone demonstration, if applicable.
<i>Printed Name:</i>	Print name of individual signing the form.
<i>Firm:</i>	Enter the name of the company or engineering firm that the individual signing this form is employed by.
<i>Signature:</i>	Signature of responsible official.
<i>Date:</i>	Enter date form was signed.

4. Office Mechanics:

Copies of this supplement along with the required information on a mixing zone demonstration are provided to the Department with an NPDES permit application. This supplement is filed in the NPDES permit file.